REMARKS

The present invention is such that **a charge controlling agent is present, at a high concentration, on a surface** (requirement 2) of **toner particles having a high circularity** (requirement 1) which can be prepared by a polymerization method or by subjecting toner particles prepared by a pulverization method to a spherical treatment, wherein the charge controlling agent is adhered to the surface of the toner particles by an external addition method (while applying a mechanical impact thereto).

A charge controlling agent can be included in a toner by an internal addition method or an external addition method.

In the internal addition method, a charge controlling agent is kneaded with other toner constituents such as binder resins and colorants (in a pulverization method), or a charge controlling agent is included in an oil phase liquid together with other toner constituents (in a polymerization method), so that the charge controlling agent is included inside the toner particles.

In contrast, in the external addition method, the charge controlling agent is externally added to toner particle which are prepared by pulverizing a kneaded toner constituent mixture (in a pulverization method) or the charge controlling agent is externally added to granulized toner particles (in a polymerization method).

In a toner prepared by a pulverization method and an internal addition method, the charge controlling agent tends to be present on the surface portion of the toner particles. This is because when a kneaded mixture is pulverized, the kneaded mixture tends to be divided at the charge controlling agent portion. Therefore, it is not necessary to add a charge controlling agent by an external addition method.

In contrast, in a spherical toner prepared by pulverization followed by spherical. treatment, the charge controlling agent tends to be buried in the toner particles, resulting in

decrease of the concentration of charge controlling agent at the surface of the toner particles.

In a toner prepared by a polymerization method, the concentration of charge controlling agent at the surface of the toner particles is low. This is because charge controlling agents are typically soluble in water and the charge controlling agent included in the oil phase liquid migrates from the oil phase to the aqueous phase even when the charge controlling agent is internally added in the oil phase liquid.

Thus, in spherical toners it is difficult to allow a charge controlling agent to be present on the surface of toner particles by an internal addition method. In addition, it is difficult to adhere a charge controlling agent to a surface of spherical toner particles because the adhesive force of the charge controlling agent to the surface of toner particles is low when the charge controlling agent is externally added under normal external additive conditions, and thereby a problem in that the charge controlling agent releases from the toner particles occurs.

In the present invention, a charge controlling agent can be fixed to a surface of spherical toner particles by externally adding the charge controlling agent under special conditions.

As recited in Claim 1, the invention is a toner composition comprising:

toner particles comprising:

a binder resin; and

a colorant,

and a charge controlling agent which is at least located on a surface of the toner particles,

wherein the toner composition has a spherical degree of from 0.96 to 0.99, and wherein the toner composition satisfies the following relationship:

$$10 \leqq M/T \leqq 1{,}000$$

wherein M represents a quantity of an element on a surface of the toner particles in units of % by weight, wherein the element is included only in the charge controlling agent, and is one of elements of second to fifth periodical elements in the long form periodic table other than carbon, oxygen and rare gas elements; and T represents a quantity of the element in the toner composition in units of % by weight.

By making toner particles having the recited components, and meeting both the recited spherical degree (SD) and charge controlling agent (M/T) limitations, Applicants are able to achieve a toner having superior image properties, and especially the combination of superior transferability, background fouling, haze factor, and fine line reproducibility, properties, as described in the specification at page 79, line 22 through page 81, line 24.

In order to demonstrate these properties, Applicants describe Examples 1-16, which are according to the presently-claimed invention, and Comparative Examples 1-4, which are not, in the specification at page 63, line 16 through page 74, line 14. The manufacturing conditions of the toners of the Examples and Comparative Examples are shown in Table 1, at pages 74-75 of the specification. Comparative Examples 1 and 2 differ from Example 1 only by the rotation speed of a turbine blade used in the surface treatment, which is 50 m/s for Example 1, 30 m/s for Comparative Example 1, and 160 m/s for Comparative Example 2. Comparative Examples 3 and 4 differ from Example 1 only in the sphering treatment temperature. The sphering treatment temperature is 250°C for Example 1, 200°C for Comparative Example 3, and 350°C for Comparative Example 4. SD and M/T were determined for the Examples and Comparative Examples as described in the specification at page 75, last line. The results are shown in Table 2, at pages 77-78 of the specification, and reproduced below:

Table 2

	SD	CCA content 1 (wt%)	CCA content 2 (atom%)	M/T	CR	Dv (μm)	Dv/Dn
Ex. 1	0.962	2.51	1.63	27	0.55	9.3	1.31
Ex. 2	0.965	2.50	5.95	98	0.62	9.1	1.33
Ex. 3	0.975	2.49	8.86	147	0.51	8.6	1.28
Ex. 4	0.976	2.55	20.9	340	0.45	8.2	1.35
Ex. 5	0.980	2.48	23.2	387	1.35	8.6	1.25
Ex. 6	0.973	2.47	25.3	424	0.75	8.3	1.26
Ex. 7	0.972	2.50	23.9	395	1.15	8.9	1.30
Ex. 8	0.978	0.05	0.26	216	0.25	8.8	1.28
Ex. 9	0.972	0.24	3.00	517	0.45	9.5	1.26
Ex. 10	0.970	1.01	18.5	757	0.68	9.0	1.30
Ex. 11	0.976	2.50	20.8	345	0.55	5.5	1.18
Ex. 12	0.973	2.53	18.3	299	0.45	5.3	1.25
Ex. 13	0.979	2.47	23.1	387	0.62	7.5	1.17
Ex. 14	0.975	2.48	20.1	335	0.33	7.7	1.26
Ex. 15	0.980	0.26	4.55	724	0.92	5.1	1.15
Ex. 16	0.985	0.25	4.55	753	0.99	4.0	1.13
Comp. Ex. 1	0.963	2.52	0.20	8	0.34	8.3	1.31
Comp. Ex. 2	0.964	2.49	69.7	1158	0.55	8.6	1.28
Comp. Ex. 3	0.953	2.50	3.33	55	0.45	9.0	1.29
Comp. Ex. 4	0.992	2.48	5.51	92	0.62	8.8	1.30

As Table 2 demonstrates, Comparative Example 1 has an M/T lower than the above-recited range; Comparative Example 2 has an M/T higher than the above-recited range. Comparative Example 3 has an SD lower than the presently-recited range; Comparative Example 4 has an SD higher than the above-recited range.

The Examples and Comparative Examples were evaluated for the above-discussed properties, as described in the specification beginning at page 78, line 2. The results are shown in Table 3 at pages 81-82 of the specification, reproduced below:

Table 3

	Transferability (rank)	Background density		Haze factor (%)	Fine line reproducibility (rank)
		At the beginning	After the running test		
	3	0.05	0.23	45	1
Ex. 1	2	0.04	0.22	36	1
	3	0.01	0.21	65	2
Ex. 2	2	0.03	0.25	55	2
	4	0.01	0.15	55	2
Ex. 3	3	0.02	0.16	46	2
	4	0.06	0.22	78	1
Ex. 4	3	0.07	0.22	68	1
	4	0.28	0.15	68	2
Ex. 5	4	0.22	0.16	59	1
	4	0.06	0.07	46	1
Ex. 6	3	0.07	0.09	36	2
	4	0.07	0.01	52	2
Ex. 7	3	0.08	0.01	48	2
	4	0.07	0.24	13	2
Ex. 8	3	0.08	0.26	11	2
	4	0.04	0.11	19	1
Ex. 9	4	0.03	0.20	15	1
	4	0.02	0.08	26	1
Ex. 10	3	0.01	0.13	22	1
	4	0.09	0.25	55	4
Ex. 11	4	0.10	0.28	48	5
	4	0.08	0.23	48	3
Ex. 12	3	0.07	0.20	39	4
	4	0.03	0.28	62	4
Ex. 13	3	0.03	0.26	58	3

	4	0.07	0.30	68	3
Ex. 14	4	0.06	0.36	67	2
	5	0.01	0.01	20	4
Ex. 15	4	0.02	0.02	15	5
	5	0.00	0.00	11	5
Ex. 16	5	0.00	0.01	9	5
Comp.	3	0.33	0.28	68	1
Ex. 1	2	0.40	0.33	66	1
Comp.	3	Cannot be evaluated**		74	1
Ex. 2	2			82	1
Comp.	1	0.08	0.33	77	2
Ex. 3	1	0.10	0.44	77	2
Comp.	Cannot be	0.09	0.28	65	1
Ex. 4	Evaluated*	0.12	0.33	56	1

* the image cannot be evaluated because the image are seriously fogged.
** the image cannot be evaluated because the image has too low image density.

Applicants describe the following with regard to the data in Table 3, in the specification at page 83, lines 4-25, as follows:

> In Table 3, the upper numerals are of the images produced by the evaluation machine A and lower numerals are of the images produced by the evaluation machine B.
>
> As can be understood from Table 3, the toners having a spherical degree and a M/T ratio in the specific ranges of the present invention, respectively, have good transferability and low background density. When the charge rising property of the toner is in the specific range of the present invention, the resultant images have low background density. In addition, when the toners do not have a charge controlling agent in the toner particles, the toner images have good transparency when the toner images are fixed. Further when the toners have a particle diameter and a particle diameter distribution in the specific ranges of the present invention, respectively, the toner images have good fine line reproducibility.
>
> These properties of the toner prepared by the polymer suspension method (i.e., the toner of Example 16) are excellent. This is because the spherical degree, particle diameter distribution of the toner fall in the preferable ranges and the toner particles are subjected to a surface treatment of the present invention while the charge controlling agent is not included in the toner particles.

The above-discussed results could not have been predicted by the applied prior art.

The rejections under 35 U.S.C. § 103(a) of

Claims 1, 5, 6 and 9 as unpatentable over JP 06-348055 (JP '055), combined with U.S. 6,077,635 (Okado et al); and

Claim 4 as unpatentable over JP '055 combined with Okado et al, further combined with U.S. 6,080,519 (Ishiyama et al) and U.S. 5,547,802 (Kawase et al),

are respectfully traversed.

JP '055 relates to a polymerization toner to which a charge controlling agent is internally added while the concentration of the charge controlling agent at the surface of the toner particles is increased by decreasing the chance of migration of the charge controlling agent to the aqueous phase liquid. Specifically, in JP '055 a charge controlling agent is internally added together with a compound (such as aromatic oxycarboxylic acids, e.g., salicylic acid), which is added to reduce the chance of migration of the charge controlling agent into the aqueous phase liquid. In contrast, in the present invention the concentration of charge controlling agent at the surface of the toner particles is increased by externally adding the charge controlling agent under specific conditions. In addition, JP '055 discloses a toner comprising, *inter alia*, a wax and a charge control agent, each of which must meet specified relationships. With regard to the charge control agent, the ratio of amount, in mass %, of the charge control agent existing in the toner surface layer ("A") divided by the amount in mass % of the charge control agent (presumably in the entire toner) ("a"), i.e., A/a, must satisfy the following relationship: $5.0 \leq A/a < 50$. JP '055 exemplifies toners according to their invention wherein A/a ranges from a high of 24.93 (Example 3) and a low of 7.14 (Example 5). In effect, JP '055 does not appreciate the presently-recited M/T minimum of 10, or that SD has any importance.

Okado et al discloses a toner containing toner particles and an external additive having particular characteristics, wherein the toner particles have an SD of from 0.920 to 0.995, and contain particles with a circularity of less than 0.950 in an amount of from 2% by number to 40% by number (column 6, lines 49-64). Okado et al further discloses that if the SD is less than 0.920, the external additive tends to localize on the toner particle surfaces, tending to result in an unstable image density, and if the SD is more than 0.995, the external additive tends to be held on the toner particle surfaces with difficulty, resulting in an unstable charging to tend to cause fog (column 8, lines 52-58). In Okado et al, the charge controlling agent is internally added in the toner. In addition, Okado et al does not disclose or suggest the concentration of charge controlling agent at the surface of toner particles.

Without the present disclosure as a guide, there would have been no motivation by one of ordinary skill in the art to combine JP '055 and Okado et al. JP '055 does not disclose an external additive. The only reason disclosed in Okado et al for using toner particles having a particular SD range is because of the effect that it has on the external additive. Since there is no external additive in JP '055, there would be no reason for one skilled in the art to look for a solution in Okado et al to a non-existent problem in JP '055. Moreover, as discussed above, JP '055 does not appreciate the significance of the presently-recited M/T being at least 10, since JP '055, in essence, equate their A/a of 5 with an A/a of at least 10. Above-discussed Comparative Example 1 herein, which has an M/T of 8, and would thus be within the terms of JP '055 with regard to this limitation, is inferior to Example 1 with regard to the properties of background density and haze factor, as shown in above-reproduced Table 3. Similarly, Comparative Examples 3 and 4 herein, which have an SD within the terms of Okado et al, but outside the terms of the present claims, are substantially inferior to Example 1 with regard to transferability and haze factor.

In sum, the combination of JP '055 and Okado et al does not present a *prima facie* case of obviousness. The above-discussed comparative data, nevertheless, is further evidence of patentability.

The other-applied prior art does not remedy the fundamental deficiencies in the combination of JP '055 and Okado et al.

For all the above reasons, it is respectfully requested that the above rejections be withdrawn.

The rejections under 35 U.S.C. § 103(a) of:

Claims 1, 2, 9, and 10 over JP 2000-112180 (JP '180) combined with Okado et al,

Claim 4 over JP '180 combined with Okado et al, further combined with Ishiyama et al and Kawase et al,

Claim 6 over JP '180 combined with Okado et al, further combined with U.S. 2001/0010887A1 (Sawano et al),

Claim 7 over JP '180 combined with Okado et al, further combined with U.S. 5,176,978 (Kumashiro et al), and

Claim 8 over JP '180 combined with Okado et al, further combined with U.S. 5,902,709 (Nakayama et al),

are all respectfully traversed.

JP '180 is described in the specification at the paragraph bridging pages 3 and 4, and the last paragraph of page 4. As described in said last paragraph of page 4, JP '180 "specifies the concentration of the charge controlling agent on the surface of the toner particles and the concentration thereof in the whole toner particles. However, it is not attempted to positively arrange a charge controlling agent on the surface of toner particles, and therefore, the ratio of the concentration of the charge controlling agent on the surface of the toner particles to the concentration thereof in the whole toner particles is less than 10. Therefore, the charge rising

property of the toner is not satisfactory. In addition, since a charge controlling agent is included in the inside of the toner particles, the toner has an unsatisfactory fixability and transparency."

JP '180 discloses that said ratio is "$\geqq$ 4.0". The only ratio exemplified that is greater than 4.0 is 5 as shown, for example, in Table 6, wherein the results appear to be excellent. Indeed, JP '180 describes, with regard to a preferred embodiment, that the ratio "is 5 or more still more preferably 4.5 or more especially preferably" [0013]. Clearly, JP '180 provides no motivation to operate at a ratio greater than 5.

In addition, JP '180 relates to a toner prepared by a pulverization method and an internal addition method. The toner is not a spherical toner.

Okado et al and its deficiencies have been discussed above.

One skilled in the art would not have combined JP '180 and Okado et al, for essentially the same reasons that one skilled in the art would not have combined JP '055 and Okado et al. In addition, the above-discussed comparative data particularly with regard to Comparative Examples 1, 3 and 4, apply herein as well.

The other-applied prior art does not remedy the fundamental deficiencies in the combination of JP '180 and Okado et al.

For all the above reasons, it is respectfully requested that these rejections be withdrawn.

The rejection of Claims 1, 2, and 9-11 under 35 U.S.C. § 103(a) as unpatentable over JP '180 combined with U.S. 6,326,115 B1 (Nakanishi et al), is respectfully traversed.

JP '180 and its deficiencies have been discussed above. Nakanishi et al does not remedy these deficiencies.

Nakanishi et al discloses a toner having a Wadell practical sphericity of 0.90 to 1.00, and stated to be superior in fluidity, transferability, storage stability under heat, low

temperature fixing ability, and hot offset resistance (Abstract). Nakanishi et al discloses further that their Wadell practical sphericity is preferably 0.95 to 1.00 and more preferably 0.98 to 1.00 (column 3, lines 21-23). Nakanishi et al further discloses that a charge control agent may optionally be present (column 10, lines 27-28 and 36-37), but nothing with regard to how the charge control agent, if present, is distributed in the toner. Thus, even if one skilled in the art were to use the toner of JP '180 having a Wadell practical sphericity in the range disclosed by Nakanishi et al, one skilled in the art would still not appreciate the importance of the combination of both the presently-recited SD and M/T limitations, or the superior results obtained thereby, and as discussed above. Indeed, even within Nakanishi et al's most preferred Wadell practical sphericity range of 0.98 to 1.00, Applicants have shown, with regard to Comparative Example 4, unmeasurable transferability. While Nakanishi et al disclose that transferability is superior in their toner, it may be presumed this is without regard to the presence and particular location of the optional charge control agent.

For all the above reasons, it is respectfully requested that this rejection be withdrawn.

The provisional rejections under the judicially created doctrine of obviousness-type double patenting of:

Claims 1-3 and 9-11 over Claims 1-10 of copending Application No. 10/392,894 (Application '894) in view of Nakanishi et al,

Claim 4 over Claims 1-10 of Application '894 in view of Nakanishi et al, further in view of Ishiyama et al and Kawase et al, and

Claim 6 over Claims 1-10 of Application '894 in view of Nakanishi et al and Sawano et al,

are respectfully traversed.

Claim 1 of Application '894 recites an M/T ratio of 20 to 500. The Examiner finds that the toner compositions recited in Claims 1 and 3 of Application '894 meet the

compositional limitations recited in present Claim 1, and thus "it is reasonable to presume" that the toner compositions recited in Claims 1 and 3 of Application '894 "satisfy the charge quantity recited in instant Claim 3."

In reply, such presumption is not reasonable, since the above-discussed comparative data is sufficient to show that the compositional limitations are insufficient by themselves to meet the other limitations of the claims. Moreover, toners that meet the terms of present Claim 1 do not necessarily meet the terms of present Claim 3.

With regard to Nakanishi et al, its deficiencies have been discussed above, in that it does not appreciate the importance of the SD range herein, which exclude an SD above 0.99, while Nakanishi et al includes Wadell practical sphericities greater than 0.99 which, in Comparative Example 4 herein, has been shown to be inferior.

None of the remaining references remedy the fundamental deficiencies in the combination of the claims of Application '894 and Nakanishi et al.

For all the above reasons, it is respectfully requested that these rejections be withdrawn.

The objection to the specification at page 5 of the Office Action is respectfully traversed. Claim 8 has been amended to be consistent with the specification. Accordingly, it is respectfully requested that this objection be withdrawn.

The objection to the disclosure with regard to the use of trademarks, in paragraph 4 of the Office Action, is respectfully traversed. As is well-known, many commercially-available colors, such as Hansa yellow, are well-known, and are not trademarks. Indeed, the term appears in some of the applied prior art discussed above, such as Ishiyama et al at column 10, line 3. In addition, as the Examiner can confirm by searching the U.S. PTO full-text and image database, the term "Hansa yellow" appears therein over 1,100 times since 1976. **Submitted herewith** is a printout of the first 50 patents from a search performed on May 18,

2004. While Applicants have not reviewed every one of these patents, Applicants can state that the term is not used as a trademark in at least some of these patents. It is clear that the term "Hansa yellow" represents a type of color, and does not signify a source. Trademarks have been capitalized in the specification herein, where appropriate. If the Examiner believes that the proprietary nature of any trademarks have not been respected in the specification herein, the Examiner is respectfully requested to point out, by page and line, such marks. Accordingly, it is respectfully requested that this objection be withdrawn.

The requirement in paragraph 3 of the Office Action has already been complied with. Applicants note, however, that their records indicate that 37 C.F.R. § 1.98(a)(2)(iii) was complied with for the Information Disclosure Statements listed in said paragraph.

Applicants note the Examiner's statements in paragraph 2 of the Office Action, but no requirement has been made therein.

All of the presently-pending and active claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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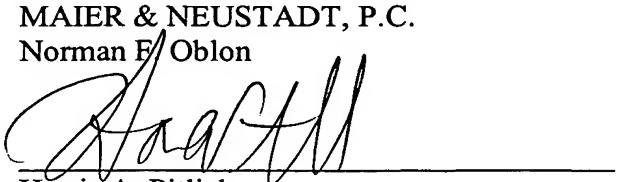

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Searching 1976 to present...

Results of Search in 1976 to present db for:
"Hansa Yellow": 1181 patents.
Hits 1 through 50 out of 1181

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Refine Search "Hansa Yellow"

	PAT. NO.		Title
1	6,737,210	T	Image formation method, electrophotographic toners, and printed matter
2	6,734,263	T	Non-polyvinyl chloride, interpenetrating network epoxy/urethane acrylates
3	6,733,945	T	Toner and electrophotographic method
4	6,733,944	T	Image forming process
5	6,733,941	T	Resin composition for toner and toner
6	6,733,939	T	Toner, developer and container for the developer, and method of and apparatus for forming an image
7	6,730,763	T	Composition
8	6,730,716	T	Emulsion ink for stencil printing
9	6,730,448	T	Image forming method, process cartridge and image forming apparatus
10	6,727,881	T	Encapsulated electrophoretic displays and methods and materials for making the same
11	6,723,784	T	Coating liquid, and image recording method and recording using same
12	6,723,765	T	Autodeposited coating of epoxy and OH groups-containing resin with NCO lower T crosslinker and higher T crosslinker
13	6,723,383	T	Preparation of images on a substrate surface utilizing an opaque coating composition that becomes transparent upon printing
14	6,721,516	T	Image forming apparatus
15	6,720,123	T	Process for producing toner for developing electrostatic image
16	6,720,122	T	Toner for developing static charge image and method for preparation thereof
17	6,716,561	T	Toner for developing electrostatic latent image and image forming method using same

18 6,710,112 T Aqueous polymer dispersions
19 6,705,874 T Colored magnetic particles for magnetophoretic display and method for manufacturing same
20 6,704,133 T Electro-optic display overlays and systems for addressing such displays
21 6,704,073 T Method of coating a polymer-dispersed electro-optical fluid and sheets formed thereby
22 6,703,176 T Toner, process for producing toner image forming method and apparatus unit
23 6,703,087 T Thermal transfer material and image forming material using the same
24 6,701,114 T Image forming apparatus and image forming process unit with developer carried on a developer carrier
25 6,699,632 T Image forming toner, and image forming method and image forming apparatus using the toner
26 6,699,312 T Emulsion ink for stencil printing
27 6,696,518 T Method of selectively hydrogenating ethylenically unsaturated double bonds in polymers
28 6,696,213 T Method of developing a latent electrostatic image
29 6,696,210 T Electrostatic charge developing toner and image forming method using the same
30 6,692,881 T Recording liquid and image forming method using the recording liquid
31 6,690,905 T Image forming apparatus including intermediate transfer element for preventing occurrence of white spot
32 6,689,824 T Prepaints and method of preparing road-marking paints from prepaints
33 6,689,717 T Image receiving sheet and transfer image forming method
34 6,689,339 T Viscous compositions containing carbon dioxide
35 6,687,476 T Developer-carrying member, method for regeneration thereof and developing apparatus
36 6,686,940 T Reversible image display medium
37 6,686,413 T Cyclohexylalkyl (meth) acrylate ester-based resin composition
38 6,686,112 T Electrophotographing dry-type toner and production method therefor
39 6,686,054 T Method and composition for the sizing of paper using azetidinium and/or guanidine polymers
40 6,683,333 T Fabrication of electronic circuit elements using unpatterned semiconductor layers
41 6,682,866 T Toner for dry developing
42 6,682,801 T Flame-retardant laminated resin molded article
43 6,681,095 T Transparent coat layer forming apparatus and color image forming apparatus using the same
44 6,680,123 T Embedding resin
45 6,676,997 T Method of forming a two-layer coat
46 6,673,138 T Multi-color crayon or oil pastel and method of producing the same
47 6,672,921 T Manufacturing process for electrophoretic display
48 6,668,153 T Cleaning blade, cleaner for image carrying body, and image forming apparatus
49 6,666,991 T Fluorescent or phosphorescent composition
50 6,663,852 T Method and makeup kit containing goniochromatic and monochromatic pigments

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